

Contractual Issues, Market Risks and Strategic Choices in Algerian PPP Seawater Desalination Projects

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(Abstract) This paper analyzes the impact of market risks on the strategic choices of the Algerian government when developing contracts of partnership between public authorities and private companies (PPP) in the financing, construction, renovation, management and maintenance of seawater desalination projects and defines the contractual issues related to the risk allocation among the different partners in these projects. The present study describes the contradictory strategic choices made by the Algerian government to develop these specific projects. This research also identifies local market characteristics that can generate significant and costly risks over the life cycle of these projects. The Algerian context is defined by risks related to market instability caused by the country's political and socio-economic environment. The Algerian market is totally dependent on the oil prices in the international market, given that the hydrocarbons sector accounts for approximately 60% of budget revenues, nearly 30% of GDP, and more than 97% of the country's export earnings. This paper tries to develop risk transfer mechanisms in the seawater desalination projects built by Public-Private Partnership (PPP) contracts, to demonstrate that the principle of the risk allocation based on the balance is the most effective way to resolve the risk allocation problems of these type of projects and presents the suggestion how to carry out this principle. The outcomes of this paper can be used by both the public sector and the private sector to ensure good management of these contract types.

Keywords: Seawater Desalination; Risk PPP Allocation; PPP Contract Management.

1. INTRODUCTION

With an area of 2.4 million km², Algeria is the largest African country and the ninth largest country in the world. Algeria suffers from a significant shortage of fresh water, as most of its territory is classified as arid and semiarid. Statistics indicate that 90% of the Algerian population is concentrated in the northern coastal region, which represents 10% of the country's area and has a more temperate Mediterranean climate than the rest of the country. Many factors contribute to the shortage of available fresh water in this country (eg. growing demand, drought, and pollution). Rainfall once constituted Algeria's main fresh water source because the use of seawater desalination was confined before 2005 just for industrial needs (mostly to produce electricity needs for hydrocarbon plants). The state water policy – managed by governmental institutions and agencies – promoted the construction of dams for use in rainwater collection. In the early 1980s, droughts became increasingly problematic, causing the authorities to make desalinized seawater available for domestic use [1]. Consequently, at the beginning of the 21st century, the Algerian government chose to address the shortage of drinking and irrigation water through an ambitious PPP program. This program would create approximately 28 large-scale desalination seawater stations along the 1.300-km-long Algerian coast designed process a

volume of 4,000,000m³/day by 2020. The importance of this program lies primarily in its financing modes; it is considered to be one of the first PPP contracts in Algeria using BOO approach, which allows to the private sector to build, own and operate all or part of a project. The authorities have made a strategic decision to involve the local banking system in financing PPP projects assigned to different partners. This allows the government to acquire the expertise and know-how to use local finance and consultancy firms to fund projects in all sectors. This local expertise will be invaluable in the realization of this ambitious program of hydraulic development in Algeria [2]. The objective of the present study is to highlight the major issues that affect the Algerian government's strategic decision making and to identify the contractual framework used to achieve strategic goals in the context of the significant risks that define the market context of Algeria.

2. RESEARCH AIM AND METHODOLOGY

To reach the goals of this paper, the research approach consists of both qualitative and quantitative research methods to identify several key issues that need to be addressed to mitigate the risks caused by the instability of the Algerian market and proposes improved management techniques to be used in the seawater desalination projects built by PPP contracts.

The research strategy adapted for this research is qualitative research of exploratory type, which diagnoses a situation, assesses alternatives, and discovers new ideas. The overall approach follows a four stage process; having established the basis of the research, necessary data are collected, analyzed, and conclusions and recommendations are made based on the findings. The methods of data collection employed for the research are case study, desk study, and interview.

In this study therefore, the aim of this research is to develop an equitable risk allocation scheme between the public and private sectors. As part of a previous research into PPP implementation by the authors, a two-round Delphi survey was conducted in Algeria from January 2012 to March 2012 with experienced practitioners to identify the preference of risk allocation in Algeria's PPP projects. However, the preferred risk allocation based on the perception and understandings of experts may not be appropriate for all sectors.

A round of face-to-face interviews was subsequently carried out from March 2012 to April 2012 to collect actual risk allocation in the existent PPP seawater desalination projects in Algeria. By comparing the preferred and actual allocations and discovering the reasons behind the differences, an equitable risk allocation scheme which is more appropriate for this type of projects could be obtained.

3. LITERATURE REVIEW

Using public-private partnership (PPP) contracts with different models (eg. BOT, BOO, BOOT and Concession), to fund hydraulic construction projects is not a new approach. For example, this approach has been popular in France since the 17th century with the construction of the Midi Canal, and it rose in prominence during the 19th century with the creation of the General Water Company and the Lyonnaise of Water and Lighting Company for the provision of urban services [3]. In this approach, delegated management includes concessions, management contracts, service contracts and leasing. In the 1990s, concessions were the main form of private investment in the water sector, with local and foreign private firms funding and operating water networks, with the concessionaire paid by the users of the system rather than directly by the municipality [4]. Delegated management is part of various PPP contract types, in effect, delegating any or all tasks to the private sector. Institutional PPPs involve cooperation between the public and private sectors and function as distinct entities that are jointly owned by both sectors [5] (eg. Algerian Energy Company [AEC]). This joint entity thus ensures the production and distribution of water for drinking or for use in various sectors (eg. agriculture and industry).

Given the importance of water desalination projects, the technological, technical, investment and management demands associated with these projects are well suited to the public-private partnership approach. In projects such as this, the type of PPP differs between countries. In Spain, leasing was adopted for 28 projects (almost 50% of

desalination projects), and in Algeria and Australia, BOTs were favored. In Gulf countries, this type of PPP is also important [6].

The first public-private partnership contract in water sector in Algeria was formed on November 28th, 2005, after lengthy negotiations between the Algerian public sector and the French company SUEZ Environment. This PPP has allowed creating the Water and Sanitation Company of Algiers (SEAAL in French), in which the two main shareholders are the Algerian Agency of Waters (ADE in French) and the National Office of Sanitation (ONA in French) [7]. The experience of SEAAL has enabled Algerian authority to develop an effective PPP model using the BOO approach to construct seawater desalination plants, and this experience can be used to form public-private partnership contracts in other industries as well.

Research on the management of PPP contracts in Algeria has focused on risk management and how those risks can be distributed. For PPP contracts of any type to succeed, risks associated with market instability (generated by political and socio-economic changes in Algeria) must be mitigated, and several studies have examined how such risks should be allocated. Bing et al. (2005b) [8] argue that most macro-level risks (eg. political, legal, social and economic risks) and risks that are 'exogenous' to the project should be borne by the public sector and specify that project-related risks be allocated to the private sector. Shen et al. (2006) [9] argue that an 'effective' risk allocation occurs if site acquisition and legal and policy risks are allocated to the public sector and design and construction, operation and industrial action risk are allocated to the private sector. Development, market, financial and force majeure risks are shared between these two partners.

4. STRATEGIC CHOICES AND CONTRACTUAL ISSUES

To improve the performance of projects in the water sector, the Algerian government has developed successful PPP initiatives to promote the construction of seawater desalination stations between 2005 and 2014 [10, 2]. The PPPs developed in this sector were successful in attracting a considerable number of international investors from countries with significant relevant experience (Table 1). Financing for these projects was provided by public state-owned banks. The government's stated strategy for developing PPPs in this sector went beyond financial considerations and considered the benefits related to the transfer of technology and know-how by foreign enterprises.

To develop PPPs and complete this ambitious program of hydraulic infrastructure, the Algerian authorities identified the following objectives:

- establish an integrated management, participatory, economic and environmental framework for projects
- streamline and economize the use of the state's budgetary resources

- improve the cost, quality and schedule of projects
- improve the assessment of the projects' maturation
- increase the performance and economic viability of projects
- improve the quality of services produced by the projects;
- increase the life of the project by establishing an effective policy of exploitation and maintenance of infrastructure.

To implement this partnership between the public and private sectors, the Algerian government has developed a well-structured contract with market appeal [2]. This demarche was complemented by the creation of the Algerian Energy Company (AEC) in 2001. The project incorporated both Sonatrach and Sonelgaz, the two largest sectors of Algerian Energy, because the desalination seawater projects are built for the production of both drinking water and electricity. AEC works in partnership with international investors to establish project companies that will, in turn, be responsible for the design, implementation, ownership, operation, maintenance and marketing of water produced under this project-financing scheme.

Due to this partnership and because the desalination projects are often undertaken in conjunction with power generation projects (which are also capital intensive), there has been a trend toward increased private sector participation in water supply projects. After significant discussion, the Algerian government has determined that BOO/BOT projects are the best way either to relieve the state of unnecessary financial burden and attract international investment and technology or to develop domestic technology and industries.

Although there is no single means or structures to use for all desalination BOO/BOT projects, certain fundamental principles apply to all of these projects. The best contractual structures allocate activities and risks fairly between the various stakeholders as following [11]:

- operational risk and responsibility with the O&M (operation and maintenance) contractor
- construction risk with the EPC (Engineering Procurement Construction) contractor
- covenant of the public sector off-taker with the state and so on

In Algeria, desalinized seawater could, as part of a revised strategy, be promoted as a strategic alternative to the currently vulnerable water supply in some coastal towns and cities. As Table 1 indicates below, desalination projects have been aggressively promoted and implemented by the Algerian government.

As shown in Table 1, Algeria has developed an ambitious program of twelve large projects with a total capacity of 2,610,000 m³/day for approximately 13 million people in only a few years (between 2005 and 2011), which this is one of the highest capacities of seawater desalination in the world.

Table1 Algerian Seawater Desalination Projects Constructed between 2005 and 2011

(Source: Algerian Energy Company)

Location (Province)	Capacity (m ³ /day)	Partner (Country)	AEC
Souk Tlata (Tlemcen)	200,000	Hyflux (Singapore)/Malakouff (Malaysia): 51%	49%
Honaine (Tlemcen)	200,000	BEFESA/SADYT (Spain): 51%	49%
Beni Saf (A. Temouchent)	200,000	COBRA (Spain): 51%	49%
Magtaa (Oran)	500,000	Hyflux (Singapore): 51%	49%
Arzew (Oran)	90,000	Black & Veatch (South Africa): 05%	95%
Plage de Chellif (Mostaganem)	200,000	INIMA/AQUALIA (Spain): 51%	49%
Ténès (Chlef)	200,000	BEFESA (Spain): 51%	49%
Oued Sebt (Tipaza)	100,000	BIWater (UK): 51%	49%
Fouka (Tipaza)	120,000	SNC LAVALIN (Canada)/ACCIONA (Spain): 51%	49%
El Hamma (Algiers)	200,000	GE Water (USA): 70%	30%
Ras Djinet (Boumerdes)	100,000	INIMA/AQUALIA (Spain): 51%	49%
Industrial Zone (Skikda)	100,000	BEFESA/SADYT (Spain): 51%	49%
El Kala	50,000	In the partner selection phase	—
Total: 13 stations	2,610,000	Number of inhabitants: 13 million	

The economic and social reforms introduced in Algeria the late 1980s had a significant and destabilizing effect on the Algerian economy. These reforms marked the end of Algeria's state-managed economy and introduced a market-based economy. As a result, new strategies are being implemented, governmental institutions are being restructured to conform to the market-based economy, and the country's water market is now open to the national and international private sectors [1].

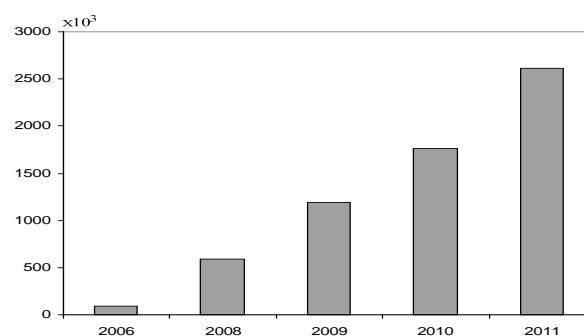


Figure 1 Evolution of Seawater Desalination Capacity (m3/day) in Algeria (2006–2011)

These changes known in Algeria have marked their strong impacts on the socio-economic and politic environment of a country. This factor is often crucial in

encouraging local and foreign investment and in making investment decisions because the management science dictates that, to move from the incubation phase to the investment phase, any contractor assesses the environment in which it would be required to operate. Similarly, the quality of a company's management is measured not only by its internal functioning but also by its relationship with all of the dimensions of its environment [12].

Between 1988 and 1999, multiple crises (political, security, and economic) have impacted Algeria, meaning that the general reforms introduced by the government have yet to be accomplished. For example, the Algerian code of public procurement regulations has experienced 06 changes, including revisions and supplements, since 2002 (D. No. 02-250 of July 24, 2002; D. No. 03-301 of September 11, 2003; D. No. 08-338 of October 26, 2008; D. No. 10-236 of October 7, 2010; D. No. 11-98 of March 1, 2011; and recently, D. No. 12-23 of January 18, 2012). This example clearly shows that the Algerian government is still establishing an institutional and regulatory framework suitable to its political and socio-economic context. This also indicates that the multiple revisions to the procurement code and other regulations related to investment and sustainable development were introduced to meet the ever-changing demands and requirements of the unstable Algerian market.

In this context, and to achieve the objectives of the PPP contracts for desalination, the Algerian government encouraged researchers to identify medium- and long-term risks in the local markets. This was done so that preventive measures could be taken to ensure that these plants could operate efficiently throughout the contract period, given that the length of the contracts in question varied between 20 and 30 years.

The major medium- and long-term risks to seawater desalination projects result from the instability of the Algerian market and are identified as follows:

- Risk of increased maintenance costs; that is, the final cost of maintenance exceeds the initial expected cost because of increases in unplanned unit prices of energy, products, or equipment required for the optimal operation of the plants.
- Risk of changes in law (legislative and government policy), including all risks related to the changes in legislation, regulation or policy that significantly impact the local market and disadvantage the projects.
- Risk of tax rate changes; that is, the risk that changes in applicable tax rates (eg. income tax rate and VAT) or new taxes may decrease the anticipated return on the equity of the projects.
- Exchange rate risk; that is, most of the private partners involved in the desalination projects are foreign partners, which raises the risk that the dinar (Algeria's currency) will be devalued against the US dollar or the euro because of market changes or unexpected economic and financial crises.
- Risk of leakage; that is, the degradation of drinking water distribution networks (which is the same network used for

delivering desalinated seawater in the future) will lead to water loss. This problem is a significant and costly risk for companies because their revenues are calculated from data recorded by household water meters. This problem is especially relevant in Algeria's urban centers.

- Risks associated with urban development plans; that is, risks that are primarily caused by planning policy and that occur when urban development is inconsistent with the predictions identified at the initial phase of these projects. These risks include the following: (i) delays in implementing urban development programs in zones near the projects, (ii) development of cities far from desalination project sites, and (iii) displacement of population from old urban centers to new areas far from project sites (following the policy of promoting the growth of new cities).

In summary, the Algerian government has managed to attract numerous partners from various countries with significant expertise in the desalination of seawater. Transparent and competitive procurement procedures were implemented, and a balanced distribution of risks between the partners involved in each project was established. To achieve the objectives identified in the strategy – namely, the acquisition of know-how and mastery of these specific project types – the Algerian government needs to reduce its currently high market risks to ensure the performance and profitability of these large investments and to protect the interests of its partners.

5. CASE OF MAGTAA SEAWATER DESALINATION PROJECT

The MAGTAA, located in Oran province 400 km west of Algiers (the capital of Algeria), is the world's largest seawater desalination station. It was started in October 2008 and is scheduled for completion in 2012. The project will use a process of reverse osmosis to produce up to 500,000 m³ of drinking water per day from seawater and is expected to supply water for nearly 4 million people in the Oran province. This mega-project cost 443 million USD and 70% of the project was financed by state-owned Algerian banks (the National Bank of Algeria [BNA]). The remaining 30% of the project was funded by Hyflux Ltd. (a firm based in Singapore). The importance of this project lies primarily in its financing modes; it is considered to be one of the first PPP contracts in Algeria to use a BOO approach. This strategic decision of Algerian authorities to involve the local banking system in financing PPP projects allows the government to acquire the expertise and know-how to fund projects using local finance and consultation firms. This local expertise will be invaluable to the realization of other projects in different construction sectors in Algeria.

Through this funding mechanism, BNA Bank was awarded the (Tahlyat Myah Magtaa SPA) of which 49% was owned by the Algerian Energy Company (Sonatrach and Sonelgaz) and 51% was owned by Hyflux Ltd. of Singapore. The contract duration was set at 25 years in local currency at a very favorable fixed interest rate (3.75%

per year). The long-term financing package offered by BNA Bank has enabled the project to eliminate risks related to exchange rates.

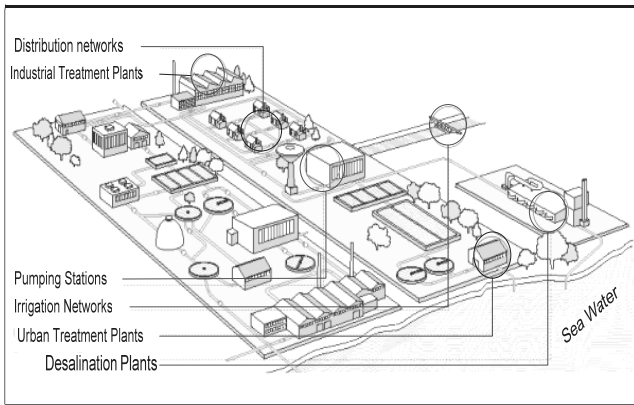


Figure 2 Example: The MAGTAA Desalination Seawater Station in Algeria

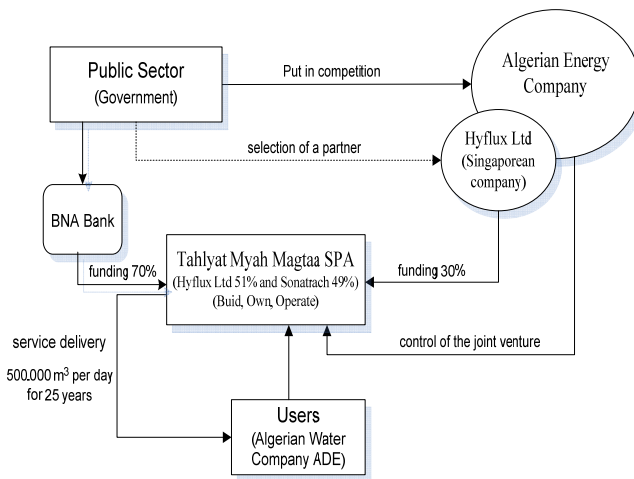


Fig.3 The PPP Structure of the MAGTAA Mega-project

6. DISCUSSION AND MAIN RESULTS

Based on the literature review in the first part of this paper and the case study analysis of seawater desalination projects in Algeria, we can identify several key strategies to improve the risk allocation mechanisms (especially related to instability and market changes) in the specific PPP projects covered in this research.

According to the results of survey feedback, the preferred allocation as presented in Table 2 shows that the public sector would take the majority of responsibility for 14 risks related to government or government officials and the private sector would take the majority of responsibility for ten risks that are at the project level. However, six risks which neither the public nor private sector could be able to deal with them alone are preferred to be shared equally. This result is very compatible with the outcomes of previous studies in the PPP risks allocation area as argued for example by Yongjian Ke et al (2010) in their research

on the Chinese Public–Private Partnership Power Projects [13].

About 83% of survey population of this research and the result of the authors' previous publication on the risks PPP projects area [14] confirm that, allocating too much risk to the private sector is not an effective solution. This approach is generally ineffective and expensive and makes projects overly vulnerable to environmental changes.

The analysis of the data of questionnaire argued that, the best way for a good management of the risks is to organize the project and its evaluation efficiently. But to implement this task, it is necessary to include the risks in a matrix that will facilitate the assessment of the major risks and understanding their interactions. In this way, McDowall (2003) and Bing et al (2005b) show how risks might be allocated between partners using an operational facilities management risk allocation matrix, which illustrates how PPP partners consider risk because the allocation of this type of risks between the public sector and private sector is not always obvious.

Table 2 General Risk Matrix of PPP Construction Projects

Allocation	Similarities
Public sector	<ul style="list-style-type: none"> - Site risk (land acquisition related) - Political risk - Currency inconvertibility and non-transferability - Expropriation - Discriminatory and specific change of laws (including taxes) - Regulatory consent - Authority's default - Operational risk - Input quantity, quality and continuity - Revenue risk - Tariff adjustment breach - Network connectivity risk - Competing route and connectivity - Market changes risk
Private sector	<ul style="list-style-type: none"> - Site risk (ground conditions related) - Design, construction and commissioning - Operating risks - Output quantity and quality - Political risk - General change of law - Revenue risks - Financial risks - Sponsor risks - Project company, contractor's default
Shared	<ul style="list-style-type: none"> - Force majeure risk - Interface risk - Disparity of the quality of the work

As it was argued by Abednego and Ogunlana (2006) the majority of interviews realized to conclude that, because parties involved in PPP projects have different perceptions of risks, good project governance systems are essential for proper risk allocation and ultimately for the projects' success – inadequate specification of requirements and improper allocation of responsibilities among the contracting parties are the main problems faced by the public sector. Risks are considered only when they materialize, and solutions are sought in response to the threats posed to minimize losses. The contracting parties are satisfied with risk allocation so long as its consequences are minimized. Moreover, the risk management strategy adopted is geared towards problem-solving rather than taking preventive actions.

From 51 of survey people of this study 45 persons confirms that, a efficiency-based risk management is, of course, the ideal approach and the goal of managers. In practice, risks are often distributed according to the logic of force between the partners and the negotiation ability of each partner, with the stronger partner allocating greater risk to the weaker partner. This scenario is not necessarily the most effective and efficient way to mitigate risks; rather, stakeholders should identify the partner that is best qualified to manage each risk.

According to the analysis of data of survey of this research, there are four risks which related to the publics sector need to give a especial attention in allocation of risks in the PPP seawater desalination projects in Algeria, i.e. "local financial markets", "Change in law", "environmental changes", "market instability". The equitable allocation for other risks would be the preferred allocation reported in Table 2.

7. CONCLUSION

The increasing scarcity of fresh water resources in Algeria is an inevitable consequence of climate change, and the desalination of seawater is becoming an increasingly important strategic resource for Algeria's future, especially given recent improvements in desalination technologies. However, desalination projects remain relatively expensive and require significant capital inputs. They also require a high level of technical and management expertise and have high operating costs (related to energy, products, and equipment). Therefore, the realization and implementation of these projects requires that the government employ the correct institutional and financial framework to ensure their long-term success.

The strategic choice of public-private partnerships (PPPs) employed by the Algerian government remains the most appropriate approach to these specific project types because such an approach can improve investment conditions and the operation and maintenance of equipment as well as the competitiveness and quality of service provided to users. There are numerous types of public-private partnerships (e.g., BOT, BOO, BOOT and Concession), and the appropriate type of PPP will depend on the political, economic, social and cultural context of a respective country, region and project area.

For PPP-contract projects to be successful in the field of seawater desalination or in other developing sectors of the Algerian economy, a number of conditions must be met. These conditions include the following: establishing well-structured contracts that define the role of stakeholders and ensure an equitable sharing of risk, offer a stable and consistent legal framework, and provide a structure for adequate funding. However, the government must improve the broader socio-economic conditions of Algeria to protect investments from risks related to instability in the local market.

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Author Introduction



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